WHAT IS CLAIMED IS:

1. A wafer processing apparatus adapted to detect a wafer on each shelf of a rack having shelves on which wafers can be placed provided in a pod, the wafer processing apparatus comprising:

moving means that can be moved along said shelves of the rack by driving means;

a first transmissive sensor movable along the shelves of said rack by said moving means and including a first emitter and a first detector that are disposed in such a way as to be opposed to each other, said first emitter and said first detector being arranged in such a way that when said first transmissive sensor is moved along the shelves of the rack, in the case that a wafer is present on a shelf of the rack, light emitted from said first emitter toward said first detector is blocked by the wafer, and in the case that a wafer is not present on a shelf, light emitted from said first emitter is allowed to pass to said first detector;

a second transmissive sensor including a second emitter and a second detector opposed to said second emitter, said second transmissive sensor being movable along the shelves of said rack with said moving means;

a dog disposed between said second emitter and said second detector and having index means that can pass or block light emitted from said second emitter toward said second detector when said second

transmissive sensor is moved along the shelves of said rack; and

a computing means for performing determination of the number of the wafer(s) placed on a shelf of said rack by comparing a wafer thickness obtained by calculating a ratio of duration time of a first signal from said first transmissive sensor corresponding to the wafer(s) and duration time of a second signal from said second sensor corresponding to said index means and a threshold value that has been set in advance in accordance with the wafer thickness and the number of wafers.

2. A wafer processing apparatus according to claim 1, wherein said threshold value set in advance is set by calculating a reference thickness of one wafer based on ratio of duration time of said first signal obtained in relation to the number of the wafers placed on said rack and the speed of said moving means and duration time of said second signal, and adding a predetermined margin value to said reference thickness of one wafer.

3. A wafer processing apparatus according to claim 2, wherein data on the duration time of said first signal obtained in relation to the number of the wafers placed on said rack and the speed of said moving

means and data on the duration time of said second signal respectively include a plurality of data, and said reference thickness of one wafer is calculated based on a plurality of ratio data obtained by calculating the ratio of the duration time of said first signal and the duration time of said second signal for the plurality of data on the duration time of said first signal and the duration time of said second signal.

4. A wafer processing apparatus according to claim 2, wherein said reference thickness of one wafer is calculated based on the ratio of the duration time of said first signal and the duration time of said second signal that are obtained under the state in which one wafer is placed on a shelf of said rack in advance.

5. A wafer processing apparatus according to claim 2 wherein said margin value is about half of the wafer thickness.

6. A wafer processing apparatus according to claim 1, wherein upon determination of the number of wafers,

in the case that a signal is not generated from said first transmissive sensor, it is determined that a

wafer is not present on a shelf of the rack;

in the case that the wafer thickness obtained from the ratio of the duration time of the first signal from said first transmissive sensor corresponding to the wafer(s) and the duration time of the second signal from said second sensor corresponding to said index means is equal to or smaller than said threshold value, it is determined that there is one wafer; and

in the case that the wafer thickness obtained from the ratio of the duration time of the first signal from said first transmissive sensor corresponding to the wafer(s) and the duration time of the second signal from said second sensor corresponding to said index means is larger than said threshold value, it is determined that there are more than one wafers.

7. A wafer processing apparatus according to claim 2, wherein the calculation of said ratio for determining said reference value set in advance is executed by said computing means.

8. A wafer processing apparatus according to claim 1, wherein the second signal from said second transmissive sensor corresponding to said index means is a signal that is generated when light from said second emitter that has been blocked by said index means is delivered through the position of the index

means to said second detector.

9. A wafer processing apparatus according to claim 1, wherein the second signal from said second transmissive sensor corresponding to said index means is a signal that is generated when light from said second emitter is blocked by said index means and does not reach said second detector.

10. A wafer processing apparatus according to claim 1, wherein said first emitter and said first detector are disposed in such a way that the path of the light emitted from said first emitter toward said first detector is inclined relative to the horizontal plane.

11. A wafer detection method for detecting, when a pod having a rack having shelves on which wafers can be placed provided therein is placed on a wafer processing apparatus, a wafer on each shelf, said wafer processing apparatus including:

moving means that can be moved along said shelves of the rack by driving means;

a first transmissive sensor movable along the shelves of said rack by said moving means and including a first emitter and a first detector that are disposed in such a way as to be opposed to each other, said

first emitter and said first detector being arranged in such a way that when said first transmissive sensor is moved along the shelves of the rack, in the case that a wafer is present on a shelf of the rack, light emitted from said first emitter toward said first detector is blocked by the wafer, and in the case that a wafer is not present on a shelf, light emitted from said first emitter is allowed to pass to said first detector;

a second transmissive sensor including a second emitter and a second detector opposed to said second emitter, said second transmissive sensor being movable along the shelves of said rack with said moving means;

a dog disposed between said second emitter and said second detector and having index means that can pass or block light emitted from said second emitter toward said second detector when said second transmissive sensor is moved along the shelves of said rack;

said wafer detection method comprising:

an obtaining step of obtaining duration time of a first signal from said first transmissive sensor corresponding to a wafer(s) and duration time of a second signal from said second transmissive sensor corresponding to said index means;

a ratio calculation step of calculating a ratio of the duration time of said first signal and the duration time of said second signal that have been

obtained;

a step of calculating the thickness of the wafer(s) based on said ratio; and

a determination step of determining the number of the wafer(s) placed on a shelf of said rack by comparing the calculated thickness of the wafer(s) and a threshold value set in advance in accordance with the number of the wafers.

12. A wafer detection method according to claim 11, wherein said determination step includes a step of determining said threshold value set in advance by calculating a reference thickness of one wafer based on ratio of duration time of said first signal obtained in relation to the number of the wafers placed on said rack and the speed of said moving means and duration time of said second signal, and adding a predetermined margin value to said reference thickness of one wafer.

13. A wafer detection method according to claim 12, wherein in said obtaining step, data on the duration time of said first signal obtained in relation to the number of the wafers placed on said rack and the speed of said moving means and data on the duration time of said second signal respectively include a plurality of data, and the obtaining step including a step of obtaining said reference thickness of one wafer

based on a plurality of ratio data obtained by calculating the ratio of the duration time of said first signal and the duration time of said second signal for the plurality of data on the duration time of said first signal and the duration time of said second signal.

14. A wafer detection method according to claim 12, further comprising a step of calculating said reference thickness of one wafer based on the ratio of the duration time of said first signal and the duration time of said second signal that are obtained under the state in which one wafer is placed on a shelf of said rack in advance.

15. A wafer detection method according to claim 12 wherein said margin value is about half of the wafer thickness.

16. A wafer detection method according to claim 11, in said determination step,

in the case that a signal is not generated from said first transmissive sensor, it is determined that a wafer is not present on a shelf of the rack;

in the case that the wafer thickness obtained from the ratio of the duration time of the first signal from said first transmissive sensor corresponding to

the wafer(s) and the duration time of the second signal from said second sensor corresponding to said index means is equal to or smaller than said threshold value, it is determined that there is one wafer; and

in the case that the wafer thickness obtained from the ratio of the duration time of the first signal from said first transmissive sensor corresponding to the wafer(s) and the duration time of the second signal from said second sensor corresponding to said index means is larger than said threshold value, it is determined that there are more than one wafers.

17. A wafer detection method according to claim 11, wherein the second signal from said second transmissive sensor corresponding to said index means is a signal that is generated when light from said second emitter that has been blocked by said index means is delivered from the index means to said second detector.

18. A wafer detection method according to claim 11, wherein the second signal from said second transmissive sensor corresponding to said index means is a signal that is generated when light from said second emitter is blocked by said index means and does not reach said second detector.

19. A wafer detection method according to claim 11, wherein the second signal from the second transmissive sensor corresponding to a signal from said second emitter in accordance with said index means is a signal that is generated when light from said second emitter is blocked by said index means and does not reach said second detector.

20. A wafer detection method according to claim 11, wherein said first emitter and said first detector are disposed in such a way that the path of the light emitted from said first emitter toward said first detector is inclined relative to the horizontal plane.